THE

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Editorial

MUNICIPAL VETERINARY SERVICE

IT may be said with truth that, prior to April 1, 1938, the veterinary services of great municipalities were a source of pride to the profession. Local authorities, aided by their staffs, had built up an efficient service which embraced many aspects of public health. It was a service which attracted many of our best men. The attraction lay not only in the chance it afforded for personal advancement, but also in the opportunities it freely displayed of being of service to the public weal.

Municipal veterinary activities were growing in their scope and usefulness and in public recognition.

All towns did not avail themselves of the services of the veterinary surgeon in a public health capacity, but during the last twenty or thirty years a gradual extension from town to town has been witnessed. It was reasonable to suppose that, as recognition extended and opportunity arose,

every town and even rural areas would in time have their full and necessary complement of veterinary surgeons organised into an efficient service.

Many authorities showed enthusiasm—an enthusiasm which extended to their staffs—and one witnessed the inception of a keen but friendly spirit of rivalry. This was good.

We feel that it is only right to mention some of the pioneers of this service, such as Trotter, Malcolm King and Shaw. They saw its inception, and it was through them that it was nurtured to a strong and healthy manhood. What would be their reaction to-day if they saw most of the bricks removed from the edifice which they were at such pains to build?

The Act of 1938 was in many ways original. It was certainly so when it took little account of established rights. Old-established municipal services were absorbed or emasculated. Some duties were taken over; others were evidently given scant thought, for they were left to die. Meat inspection came in the latter category. The profession has always been at great pains to insist that the only person competent by virtue of his training to inspect meat and assess its worth as a human food is the veterinary surgeon.

This allegation naturally gave rise to much opposition, and sometimes it led to real antagonism.

In spite of this, progress could not be arrested and the veterinary surgeon won the recognition which was his due from public authorities. Are our ramparts and prestige so dearly won to be idly thrown away by inaction? We must demand a fair deal for our municipal veterinary services and, above all, that meat inspection shall remain one of the essentials of a municipal or State veterinary service.

RESEARCH INTO PREVENTIVE MEDICINE

THE Medical Research Council has set up a "Committee on Research in Preventive Medicine." Whilst applauding the inception of such a committee, one is constrained to ask, "Why the long delay?"

Our first duty is to prevent disease, not to wait until it has occurred in order that we may attempt a cure. One would think that one of the first duties of such an august body as the Medical Research Council would have been to establish such a committee and not to wait until nearly twenty years have passed before taking the necessary action. Of course, if a disease can be prevented, or if it does not occur, our friends the pathologists and bac-

teriologists would lose a lot of their legitimate plunder. Under such circumstances one could liken them to the unemployment bureaucrats if by some mischance unemployment ceased to exist.

For many years there has been a great tendency to think of medical or veterinary research in terms of pathology or bacteriology. Such a conception is misconceived. All branches of the science can help. One might go further and say that one branch is no more important than the other. This is especially true of veterinary science. We would like to see our colleges and research institutes with field stations in which all sections could delve. It is not to the advantage of man or animal that the activities of such stations should be confined to one section of the science. Collaboration is essential. To work in watertight compartments is to our disadvantage, and only tends to a parochial outlook.

The veterinary profession we are proud to say has long given a lead in the realms of preventive medicine. This has probably been best shown in the colonial services. It has been said that by preventing and controlling disease in native and imported stock the veterinary surgeon has been the most important factor in the successful colonisation of many parts of our Empire.

We would like to take this opportunity to make a suggestion to the Medical Research Council. It is that it would be to their general advantage if the names of one or more veterinary surgeons were to be added to the list of names they have so recently published as constituting their Committee on Research into Preventive Medicine.

General Articles

A VISIT TO THE LEIPZIG VETERINARY COLLEGE AND THE PUBLIC ABATTOIR

By ALLAN J. JAMES, B.Sc., M.R.C.V.S.
Peterborough.

THIS is situated in the suburbs of a large town of approximately the same size as Birmingham; about 20 years old and yet remarkably up to date in design and equipment.

The site is a large flat open piece of land and each department has its own buildings and is entirely independent from its entire staff to its epidiascope—a piece of apparatus seen in every lecture room as a fixture. There are the usual amenities and sports places for students with, in addition, an excellent sunken " ride " of grass with sloping walls of grass for exercising horses. (An inside ride is used for testing wind.)

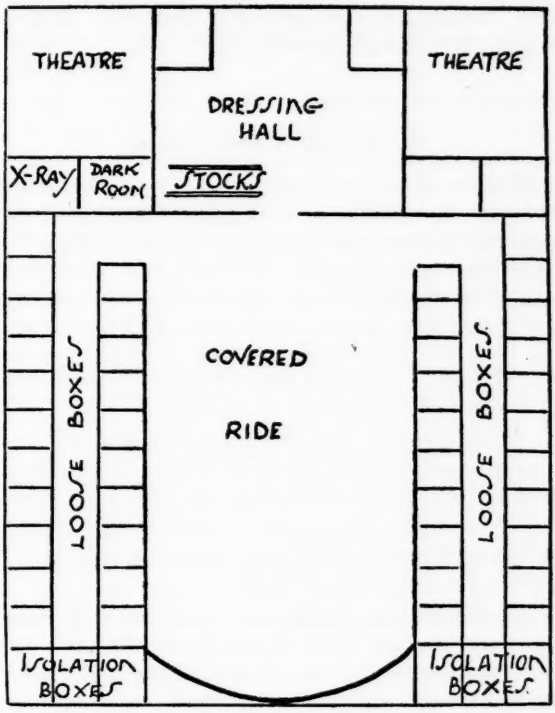
The conditions of entry are more or less the same as those prevailing in Great Britain and the curriculum appears similar with the exception that each student must, on the completion of his college studies and examinations, spend six months as a veterinary officer with the army before he is free to do as he chooses. To my mind this demonstrates that although Germany has mechanised her army she still has, and intends to maintain, a large number of animals in it. This is corroborated by the fact that some regiments have already been rehorsed and one heard when making discreet inquiries that mechanised transport failed badly during the Czechoslovakian affair.

My visit was made during the vacation time and so perhaps I did not see as much as I might have done during term time, but it was very noticeable that in every department the staff, large in number compared with our standards, were preparing specimens and dissections to a far larger extent than we had at college. The number of accurate and easily comprehended wall diagrams also surprised me and serve an excellent method of teaching or refreshing one's memory.

The majority of my time was spent in the surgery department. Externally this is an old building, but inside it is remarkably up to date and well arranged, consisting of two operating theatres, with the necessary rooms for the pre-

paration of patient and surgeon, with adjacent X-ray control room, horse boxes, dressing spaces and covered ride, together with the usual accommodation.

The arrangement seen in the plan is extremely good. One operating room has Vinsot's metal casting apparatus (old R.V.C. students will remember that a model of this stood by the old operating bed but was rarely, if ever, used).



This is largely used for operations on the extremities and also for all X-ray work where casting is necessary. The X-ray apparatus is suspended from the ceiling over this apparatus and can, of course, be used in every conceivable position. The mechanism is controlled from an adjacent room next to which are the dark rooms. The other theatre has ordinary operating tables for small animals. Towards the walls and in the middle is a large padded metal bed on which patients are cast. The entire bed is then raised mechanically by hydraulic or electric power to a height convenient to the operator.

In this department it was made very clear that every effort is made to

preserve the number of horses in the country—regardless of cost or economy—e.g., the charges are more or less the same as those made at the R.V.C. yet there was an ordinary vanner worth £25 if fit to work which had been in hospital for three months, and on the day I was there it was puncture-fired again, and would remain there another month in spite of a very unfavourable progress. Another case was an aged greasy legged heavy cart horse which had had the "grapes" removed to allow it to work a little longer.

The same thoroughness in equipment and utter lack of economic consideration prevailed in other departments.

The Central Abattoir System

To-day in England there is a move on foot to enforce centralised slaughter of food animals and so I visited the huge public abattoir at Leipzig at which (with the exception of emergency slaughter) all animals being slaughtered for food within a radius of 25 miles must be slaughtered. I would mention here that the meat-producing population of the country has been so reduced that each butcher is allocated so many of some or each class of beast, and usually it turns out that the man gets only 25 per cent. of the meat he used to handle before the control began. "This control is extremely strict now that the Jews have barred the export of frozen meat to Germany."

The price the butcher has to pay for his beast is fixed by the Government, as also is the price at which he may retail his meat. This price is so arranged that for each of the four grades the butcher can only charge a certain amount. If he charges, for example, the top grade retail price for the second-grade meat, "Inspectors continually check up the prices charged," and, if found out, he is either heavily fined or else imprisoned.

All types of animals are slaughtered. Bulls, bullocks, draught bullocks, cows, heifers, calves, etc., are killed and are graded into four grades, the top one of which would qualify for our lowest subsidy, and the bottom one of which consists of "screws," many of which would, in Great Britain, obviously be condemned. Nevertheless, these "screws" are allotted to butchers who *must* take them and pay for them. If the carcass is condemned the butcher is refunded his money seven days later, and, unless by any chance someone has not taken all the beasts allocated to him, that butcher has to go short of meat. The result of this is that very few shops have any meat to sell for more than two days a week. Everything at the abattoir, lairage, weighbridge, commission on selling the animal, slaughter fees, etc., are charged to the butcher and these charges average out at about 10 per cent. of the cost of the animal.

The slaughter system is good and greatly facilitates meat inspection which is done by a body of trained men, some of whom inspect heads, some abdomens

and so on. All definitely diseased carcasses are condemned and all doubtful ones are sent to another hall where they are examined by veterinary surgeons, *some 78 of whom are employed at the abattoir.* In this hall also are dressed any animals that get damaged or look like dying before being slaughtered in the ordinary way. Attached to this hall is a well-equipped laboratory in which, in addition to certifying the cause of each condemnation, regular analysis of prepared foods of all types is made. Moreover, this department undertakes, free of charge, any analysis required by anyone in the town. *It was particularly gratifying to me to find that this department was also staffed entirely by veterinarians.*

To return to the slaughter halls, the following facts were noted: Everybody leaves his mess behind for the next fellow to clear up, with the result the place is filthy. All slaughtering is done in turns and with even a few moments' delay over every change (each man has to supply all his own kit) an incredible amount of time is wasted. I saw one butcher who had arrived at 9 a.m. and by the time he had slaughtered two beasts, four calves and three pigs, collected his offals, etc., and was ready to depart it was 5 p.m., and this is a regular occurrence. All the offals are taken away and cleaned in a special hall, but in spite of being marked by the butcher, mixing appears inevitable.

To me the centralised slaughtering plan has always seemed theoretically very good, but now I feel that were it adopted in this country butchers would very quickly realise the amount of time and money spent in taking their beasts, say, 10 miles, to the slaughterhouse, slaughtering them there (taking their turn) and bringing the meat back. The result would be that many butchers who now kill their own meat would buy more already killed, for by doing so they would not take the entire carcass—refusing parts such as briskets, etc., which have very limited sale and then at a bad price—but would buy just what part they wanted, e.g., hind quarters, loins, etc. The effects of this would be, firstly, that many of the markets at which fat beasts are now sold to numerous butchers, who bid against each other, would find the competition very decreased, which would lead to lower prices or closing of the markets, and secondly, as the butchers would only buy parts of the carcass for which they have a ready sale, the wholesalers would have the other parts left on their hands. These would presumably be used for some purpose such as canning, but would have to be sold at a price as comparative to the price prevailing to-day as the price of milk for manufacturing is to the retail price of milk. The conclusions, therefore, are either that the farmer gets less for his beasts or that the man in the street will have to pay more for his sirloin or steak—and probably both.

I went to Germany knowing little or no German and was impressed by the number of people whom one could both understand and make understand, and wherever I went I found them only too pleased to tell me all they could

and show me all they had to show—and this in spite of the fact that I went without any introductions whatever. How different are the conditions in England, where, as the senior pathologist at the abattoir told me, in spite of official introductions, etc., he was refused entry to many places when he visited this country.

MAL-DE-CADERAS IN VENEZUELA
(Synonym Derrengadera)

By EDWARD MORGAN, F.R.C.V.S., D.V.H.
Venezuela.

As the research work which is being carried out on derrengadera in Venezuela has not yet reached its final stages, I shall endeavour to confine these few notes as far as possible to the preventative or prophylactic side of the subject, based on the experience of about a quarter of a century in connection with this particular disease of horses, mules and donkeys in Venezuela. I might mention that almost all drugs figuring in the pharmacopœia as well as the secret medicines of the Indians of Venezuela have been tried as curatives, but with little effect. By using either Naganol, tartar emetic or Antimosan (the latter a drug containing 34 per cent. antimony), the life of the animal on rare occasions may be prolonged for months—indeed, in isolated cases we might say a year or two. Nevertheless, such cases are of little value because relapses occur, especially when the animals are exerted. Furthermore, they may act as carriers of the trypanosomes.

In certain extensive areas on the plains of Venezuela this disease is often the cause of death of nearly 100 per cent. of the horses and mules, which indirectly is the cause of so many wild and unbranded cattle on the ranches. When the horses die the cowboys are unable to round the cattle on those vast and unfenced areas. Fortunately, there are certain regions of the Republic situated on higher level than the plains of the Apure and the Orinoco, where it is possible to breed and supply horses to the ranchmen of the lower plains, otherwise they would in the majority of cases have to abandon these ranches. To buy a fresh supply of working saddle horses almost every year shows the balance sheet against instead of in favour of the ranch. Each

cowboy is supposed to have three saddle horses at his disposal, so as to work two days a week with each horse.

Previous to the advent of Naganol (Bayer 205) we had to rely upon tartar emetic in one-gram doses dissolved in 40 c.c. of normal saline solution, injected intravenously, both as a so-called curative and preventative. Years ago, whilst working in collaboration with two eminent Venezuelan scientists, viz., Doctors Nuñez Tovar and Juan Iturbe, we were at first delighted with the results of tartar emetic as a great number of the animals, which did not manifest symptoms of paralysis previous to being injected, improved in condition and within a few weeks' time had completely changed their rough, unhealthy coats to a sleek and shiny appearance. Unfortunately, this was only temporary, due probably to the vermicide action of the antimony both in the intestines as well as in the blood-stream. Upon making blood tests at intervals, it was found that there were still trypanosomes in the blood, which proved that the injections had not the desired effect on the hœmoflagellata in spite of repeated injections at reasonable intervals. The effects of Naganol and Antimosan had more or less the same unsatisfactory results on animals already infected.

Naganol as a preventative of Mal-de-Caderas.—Before one attempts to make use of Naganol or any other drug as a preventative of this disease, one should make a careful test of the blood in order to be satisfied that the animals are free of trypanosomes, also to keep one or two of the animals from the same mob as controls. We selected ranches where formerly all the horses were dying every year of this disease. We injected the horses with Naganol, with the exception of the controls, at intervals of three months for one year as follows: One gram of Naganol dissolved in 40 c.c. of normal saline solution. Each horse received this quantity intravenously. At the end of the year all the injected horses were apparently healthy, and the controls had died of Mal-de-Caderas.

We have tried tartar emetic on a smaller scale as a preventative, but not with such satisfactory results as with Naganol. We have also tried the effects of intravenous injections of Naganol at intervals of six months instead of three; this again was not a success.

I should like to draw the attention of students to page 405 in Milk's excellent book on Veterinary Pharmacology, where under the therapeutic action of "Antimonii et Potassii Tartras" the following appears: "Trypanosome diseases: Dixon states that it possesses a remarkable toxic action upon trypanosomes when administered *subcutaneously.*"

If the student wishes to keep clear of tumours I would advise him to inject it in weak solutions intravenously, not subcutaneously, and take all possible precautions so that none escapes into the tissues between the hair and the lumen of the vein.

A RECORD OF TWELVE OUTBREAKS OF PARATYPHOID DISEASE IN PIGS IN NORTHERN IRELAND

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DURING the year which has elapsed since the appearance of an article on swine paratyphoid in Northern Ireland in the *Veterinary Record* (February 26, 1938) further outbreaks have been met with, twelve of which are described in this communication.

CASE 1.—This farmer maintains a stock of about 400 fattening pigs. These pigs are bought in from markets or from farms at 10-12 weeks old and fattened. The hygiene on the farm is moderately good. The main fault is that the owner overcrowds the pens, but that so far appears to have caused little trouble. An occasional pig is lost from pneumonia, and during the summer a number from swine erysipelas. We were asked to visit the farm when six pigs in one pen of 20 showed a peculiar reddening of the skin over the shoulders. The pigs were dull, had only a slight temperature and were still taking some food. Diagnosis was of the "wait and see" variety and the owner was advised to isolate them and feed sloppy feeds and to inform us of any deaths. Four days later the owner informed us that one pig had died after becoming red almost all over and that the remaining five had completely recovered.

On post-mortem examination the spleen and liver were large and congested. There was some pneumonia present affecting the apical lobes of the lung. Cultural examination of the liver and spleen showed a pure growth of the paratyphoid (Kunzendorf) bacillus. Since then no further deaths have been reported, although no further measures were adopted.

CASE 2.—This farmer fattens about 600 pigs. The housing is not good and the hygiene is moderate. Losses on the farm are not heavy, the most serious troubles being rheumatism and pneumonia. We were consulted about the prevention of rheumatism. About 20 pigs were affected and were in various stages of deformity, having been affected in some cases for as long as six weeks. On the day the farm was visited one pig was collapsed and showed deep reddening of the ears and skin of the abdomen. The pig was also obviously affected with severe pneumonia. On post-mortem quite two-thirds of the lungs were solid and the liver and spleen were enlarged and congested. Cultural examination of the lungs, liver and spleen showed a pure growth of

the paratyphoid organism. Since improving his housing and the general comfort of the pigs the farmer reports very satisfactory results. No further cases of rheumatism have appeared and no further mortality has occurred during the three months' interval which has now elapsed.

CASE 3.—This farmer keeps about 40 fattening pigs. The housing and general hygiene are good. The previous history of this farm was that pig fattening had always been very successful until this particular lot of pigs were purchased. The pigs were bought when about 12 weeks old and appeared in good health. At the end of a fortnight a new ration was substituted and within a few days a number of pigs were off their feed and obviously ill. The ears in a few cases had turned blue or purple. One pig was killed in extremis and on post-mortem showed enlargement and congestion of the spleen and liver with some pneumonia. Smears from the spleen showed Gram negative bacilli and cultural examination confirmed the presence of paratyphoid organism. The owner was advised to turn the remainder of the batch of pigs out to grass and arrange for suitable housing to permit free access to the field. Four more pigs died from the paratyphoid infection, while the remainder recovered and were successfully fattened. We have had no report of any further trouble since then (five months' period).

CASE 4.—This farmer has a fattening establishment with a stock of about 120 pigs. Conditions on this farm are very good, although the houses were somewhat draughty. That fault has been remedied recently. During the past two years some six isolated cases of paratyphoid disease have occurred, the paratyphoid organism being isolated from each pig. All six were pigs about 16-20 weeks old and all showed typical blue or purple ears. A varying amount of pneumonia was present in each case. The health of the pigs on this farm is exceptionally good and these cases of paratyphoid have been isolated ones. Not more than one pig has died from paratyphoid in any particular batch and one finds some difficulty in explaining why an occasional isolated death from paratyphoid disease should occur in a lot of pigs. The history of this farm is cited to illustrate this point.

CASE 5.—This man fattens about 40 pigs at a time in a shed attached to his joiner's shop. Conditions are very unsatisfactory. The help of the laboratory was invoked in connection with a serious outbreak of pneumonia amongst pigs 14 weeks old. Four out of a batch of 20 had died. Post-mortem showed severe pneumonia in all four cases and in each case the livers and spleens were enlarged. The paratyphoid organism was isolated from the liver and spleen in each case. The owner was advised to put the pigs into an empty poultry house in a field nearby which he had rented, and arrange for the pigs to have free access to the field, by removing the existing door and substituting a swing door, hinged horizontally about three feet from the floor. Two more deaths occurred after this, but these were pigs which were very seriously ill

at the time of the visit and were not expected to recover. The remainder did remarkably well and six weeks later they were returned to the original house and successfully fattened. No further losses have occurred.

CASE 6.—This pig breeder both rears and fattens pigs. Conditions are very good on this farm and the stock would comprise about eight breeding sows and about 100 fattening pigs. Losses from paratyphoid in this case were confined to piglings and at one period one whole litter and about half of two other litters died from paratyphoid diagnosed in most cases by the appearance of blue ears and enlarged and congested livers and spleens and confirmed in two cases by cultural examination. Advisory treatment in this case consisted of isolating each breeding pen and providing each with an outrun. Losses then ceased and no further outbreaks have occurred. No pneumonia was found in the two piglings post-mortemed, but prior to the outbreak of paratyphoid the farmer had consulted us about sneezing and coughing amongst piglings.

CASE 7.—This pig breeder, in addition to rearings pigs, fattens about 200 and may occasionally sell surplus piglings. Conditions on this farm are fair. There would be normally about 15 breeding sows on the farm. The paratyphoid outbreak on this occasion occurred amongst a batch of 30 piglings which had been weaned for about a fortnight. Almost all the pigs became affected. Seven piglings died with the acute form, showing typical blue ears and enlargement of the liver and spleen. Most of the remainder developed the chronic intestinal form—necrotic enteritis—and of these six eventually died. The others, although showing diarrhœa and emaciation, gradually recovered after a hole had been made in the wall of the pen allowing free access to a field. Pigs of the same age in neighbouring pens did not become affected. Of three pigs post-mortemed all showed some pneumonia, while two had enlargement of the spleen and liver, and one had necrotic enteritis. Cultural examination was positive for paratyphoid in each case. No further losses have been reported on this farm during a 12-month period. This outbreak is interesting in that the disease appeared only in one pen and did not spread to adjoining pens.

CASE 8.—This pig owner has small premises in Belfast and fattens up to 20 pigs at a time. His pig house was not visited. One pig was brought to the laboratory with the history that he had lost two pigs suddenly the previous day and this pig was the third to die. The ears and throat of this pig showed red discoloration and on post-mortem examination there was enlargement of the liver and spleen, smears from which showed numerous Gram negative bacilli. Pure cultures of the paratyphoid organism were isolated from these organs. Pneumonia was also present. The owner was advised to keep the pigs warm and comfortable and to advise us if losses continued. No further losses occurred and he has had no similar trouble amongst pigs since.

CASE 9.—This farmer fattens about 60 pigs. The housing and conditions generally are poor. Trouble began with diarrhœa and wasting in a batch of 18 pigs which he had bought a fortnight previously. Two pigs died and these on post-mortem showed extensive necrotic enteritis. The paratyphoid organism was isolated on brilliant green agar plates. Cultures from the liver and spleen were negative. A third pig died and in this case there was enlargement and congestion of the liver and spleen along with some necrotic enteritis. This time cultural examination of the liver and spleen proved positive for paratyphoid. The owner was advised to turn the remainder of the pigs out on pasture and make use of an old hen house for the survivors which appeared to be nearly all affected. Of the 18 pigs, 11 survived and were fattened. In the same house and separated by a 3 ft. high concrete wall were the other fattening pigs from 20 weeks old upwards. The disease did not spread to them. Since that outbreak of paratyphoid the farmer has put two fresh batches of pigs through the same pen with no losses. The pens were cleaned and washed out with disinfectant prior to the introduction of a new lot of pigs. Again one has difficulty in explaining why the losses were confined to a particular lot of pigs in one particular pen.

CASE 10.—This owner keeps three sows and fattens his own pigs. Housing and general hygiene are poor. The owner reported, however, that he very rarely lost any pigs except occasional deaths in piglings due to accident. Two deaths had occurred in a litter of pigs shortly after weaning and one was brought to the laboratory for examination. The pig had typical discoloration of the ears and on post-mortem showed some pneumonia and enlargement and congestion of the liver and spleen. Smears from the spleen showed the presence of Gram negative bacilli and cultural examination confirmed the presence of paratyphoid. The owner was advised to allow the pigs out of doors as much as possible and to see that the houses were well cleaned out and made as comfortable for the pigs as possible. A visit was paid to the farm a fortnight later and the owner reported no further losses and the pigs appeared to be in excellent condition. No further losses have yet occurred.

CASE 11.—This owner has only recently commenced pig-keeping. He rears and fattens and sells any surplus " suckers." Housing conditions were bad. Paratyphoid was confirmed in a litter of pigs five weeks old. The history was as follows. The piglings were thriving very well until quite suddenly one pigling developed " blue " ears. Within 24 hours the whole body became discoloured and the pigling died shortly afterwards. A second pigling developed similar symptoms, but was still alive when the farm was visited. Two others of the litter showed discoloured ears. The remainder of the litter were healthy except for an occasional sneeze and cough. All three sick pigs were killed and on post-mortem showed enlargement and congestion of the liver and spleen, and the paratyphoid organism was recovered from the liver

and spleen in each case. The owner was advised (1) to arrange his house so that the piglings could have free access to a field, (2) to attend to the walls of the house so that draughts were excluded, and (3) to provide a warm, comfortable bed for the piglings. This was done and the remaining pigs in the litter did not develop the disease nor did the piglings in a neighbouring litter which were allowed to run about with the affected litter become affected.

CASE 12.—This last farm to be reported on is a highly organised pig farm on which there are approximately 6,000 pigs of all ages. The owner rears and fattens and, if necessary, buys in pigs for fattening. Conditions are exceptionally good. The first serious outbreak of paratyphoid occurred on this farm three years ago. Piglings on the sow were chiefly affected, but paratyphoid occurred in pigs of all ages up to 24 weeks old. In older cases the disease was not a septicæmia, the organism being found only in the pneumonic lungs. Vaccinations with a dead vaccine were carried out with doubtful success. Disinfection was rigorously carried out, also with limited success. After numerous attempts at transmission of the disease experimentally at the laboratory, it was decided that some factor or factors were necessary for the organism to become pathogenic and it was thought that whatever caused sneezing, coughing and pneumonia was the initial factor in cases of paratyphoid on this farm, since sneezing, coughing and pneumonia were particularly prevalent. Attempts were therefore made to control this syndrome and since outdoor rearing on such a large scale was impossible on a small acreage, it was decided to isolate each pen on the farm as far as possible. The houses contained long rows of pens in most cases with an out run, and the height of the concrete walls separating each pen was about three feet. To isolate each pen the dividing walls were extended to the roof with wooden boarding. Inside the pen a small wooden house was erected in one corner. This house was provided with a low door just big enough for a large sow to enter. Inside this house a further low shelter was provided for the piglings along the back wall where one would expect to find a farrowing rail and this subsidiary shelter also serves that purpose. At the exit of the house to the run a doubly baffled porch was erected and the lower half of the door was replaced by free sacking. The object behind these measures was to provide the piglings with warm, comfortable, draught-free houses and at the same time allow them free access to the open yards when they wished. Artificial heating of the houses was dispensed with and it was found that temperatures in the inner house varied only a few degrees, although readings have now been taken at all seasons and times of the year. A temperature of about 70 deg. F. was aimed at for pigs up to eight weeks old.

The results indicate that this procedure has proved of very great value in reducing the incidence of paratyphoid. The number of clinical cases of the disease occurring is very much smaller and post-mortem examination of any

fatalities has confirmed this. Occasional cases of paratyphoid, however, still occur, and sneezing, coughing and pneumonia have not been altogether eliminated, although the incidence of this syndrome (piglet influenza) has been considerably reduced.

Recently on this farm attempts to treat clinical cases of paratyphoid with M & B 693 have been made and the results to date have been most encouraging. Cases of blue or purple ears if dosed immediately with four tablets of this preparation have recovered and appeared normal in 24 to 48 hours. Also in cases of clinical necrotic enteritis the same drug has been used with excellent results. In this case it is necessary to repeat the dosing daily or at short intervals over a period of about a fortnight before the pig begins to show a healthy skin and put on condition. Once improvement commences recovery is usually rapid.

Cases of paratyphoid with skin lesions which were described in the previous article (*Vet. Rec.*, February 26, 1938) have not appeared recently and opportunity for using M & B 693 on such cases has thus not presented itself. This, however, will be done when occasion permits.

Summary

It would appear fairly conclusively that a disease of pigs caused by the paratyphoid organism does exist *per se*, although certain circumstances are required for the organism to become pathogenic. Pneumonia appears to be one of these factors. Farms on which paratyphoid was a problem and on which outdoor rearing has been adopted have been completely freed from the disease. Apart from the instances recorded in this article, we have several farms where such results have been achieved. We also find that by turning affected pigs out to grass a fair percentage of recoveries occur and the disease does not spread to the apparently healthy pigs in the batch.

Experimental treatment of some 30 cases with May & Baker's 693 has given results sufficiently encouraging to warrant experiments on a much larger scale.

THE USE OF NON-SPECIFIC GENERAL ANTIGEN IN THE TREATMENT OF ENDOTOXIC INFECTIONS

By E. MIDDLETON PERRY, F.R.C.V.S., and CHARLES H. PERRY, M.R.C.V.S.

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SINCE the introduction by Jenner in 1796 of vaccination in the prevention of smallpox, the use of antibacterial agents in prophylaxis and therapeutics was evolved through various modifying stages. At first, the living organism

was used (Jenner) to produce by mild infection an antiserum whose effect withstood the far more virulent infection of a related organism. Then the culture was killed, and Wright, working particularly in connection with typhoid, repeated the earlier success with no less triumph. But the rule was not invariable between, as it were, the dead and the living. It became obvious that two remedies so utterly opposed in nature opened an enormous field in the intermediate stages for investigation into attenuation. There were infinite possibilities, infinite dangers. These dangers and successes, however, were not only attendant upon the whole field: advantages and disadvantages were encountered in the particular branches; and among these the greatest proved unquestionably to be the fact that, as well as beneficial antibody stimulation, non-specific foreign proteins caused also shock reactions. This—a considerable drawback—naturally led to the desirability for substituting, in place of the antigenic bacterial protein, a suitable material unproductive of reaction, so that, although these detrimental effects might be eliminated, the beneficial response might remain unimpaired. The question was not unanswered, for this sequence of needs appears chiefly to have been considered in the introduction to the veterinary profession some ten years ago of a virtually protein-free antigen designated "Davenil." Indeed a general antigen, so much demanded, became available.

Polyvalent in action, it is an agent free from all but a trace of protein (thus, incidentally, rendering it necessary to modify the old-established idea that an antigen, to be efficacious, must automatically be protein in nature) and has shown itself, in our hands, at least, to have a definite stimulant effect on antibody production and leucocytosis, embracing in consequence the treatment of a group of infective diseases.

We have used Davenil in bacterial conditions of considerable variety, but all of which naturally fall within a group of infections by endotoxic organisms, principally cocci: streptococci, staphylococci, pneumococci, etc. But one finds, often unfortunately, that it is only natural to postpone the use of any new therapeutic agent either until the more customary methods have failed or until an unusual problem arises out of the case in question. Thus we ourselves. We have used Davenil for 2½ years, but it has existed 10. We have employed it mostly among the smaller animals, yet, nevertheless, it would be ungrateful to preclude mention of the successful treatment of the commoner septic conditions (wounds, etc.) in the larger animals and, more particularly, the undoubted benefit to a stable of some 15 horses, all of whom had suffered for a fortnight with cough. Even so, our greatest experiences have occurred among dogs and cats.

In the treatment of wounds caused, among dogs, through fights or accidents, and among cats, through abscess formation at the site of injury, Davenil quickly promotes healthy granulation and freedom from offensive discharges. Equally, within at most a couple of days, the animal itself shows marked

improvement in general condition and the wound assumes a healthy appearance. And in those cases, so common among cats, of necrosis of an injured paw involving the greater part of the metacarpus or metatarsus, and usually complicated with several septic foci, the results are particularly gratifying, and recovery, aided by antiseptic local treatment (Entozon), more rapid than one normally dares to prognose.

We have also had considerable satisfaction in recent months in the treatment, also in cats, of coryza and (for lack of a better term) "snuffles." One case, a three-year-old uncastrated male cat, subject to the condition off and on for a year, had suffered when first attended for one month but cleared under Davenil treatment after three injections.

Among dogs, who form the majority of our patients, corneal ulceration responds excellently, a bi-daily 1 c.c. injection serving to save the sight of many pekingese who otherwise would have become blind. Sometimes, indeed, the infection to all appearances clears with such rapidity that the peculiar dryness of the cornea, so frequently alarming, must be counteracted with an oily dressing (liquid Iodex?).

Again, that other distressing condition of ulcerative dermatitis, which, being not dissimilar from follicular mange, necessitates such possibility being eliminated by microscopical examination, and which is frequently incident among short-coated black and/or tan dogs (Labradors, black and tan mongrels, etc.) responds within a few days, one case, affected in almost the whole of the left hind leg up to the hock and in smaller degree on both fore legs, being largely recovered after ten injections covering a period of 14 days. Local treatment, we have found, is not alone responsible since it was repeatedly tried before our use of Davenil, without satisfaction.

More recently, suppurative otitis (golden cocker spaniel) showed marked benefit after one injection, the discharge drying and the fœtor considerably diminishing.

These few examples reveal briefly the variety of conditions in which Davenil serves good purpose, and from which, even in the beginning of our use of it, we concluded that it would be invaluable as a precautionary measure before operation. Normally, in laparotomy, one can aim for and achieve surgical asepsis, but there yet remain cases of an infective nature—pyometra and metritis, enterotomy and, more rarely, enterectomy; and Cæsarean section when, say, there has of necessity been recourse to instruments at first in parturition—in which a 2 c.c. injection of Davenil has halved probable post-operative complications, and a further course enabled healthy recovery. Five days after resection of 10 inches of intussuscepted bowel in a six-months-old Alsatian dog puppy, the wound had healed and the dog returned home. This also gives a pointer to the advantages of early use of Davenil in post-parturient infection.

Furthermore, it is evident that veterinary practice offers a very wide field

for an agent which can stimulate the normal antibody-producing mechanism and one which in addition is absolutely safe; for never in our experience have even large and often repeated doses induced any remote degree of shock or ill effect.

The rapidity of response is in proportion to the acuteness of the infection, since in acute infections the antibacterial mechanism is already highly sensitised. Too much stress cannot be laid on the importance of early application, for it increases local defence activities, and therefore exudate; shortens the duration of infection, reduces pain and lessens the extent of toxæmia. In almost every septic condition occurring in routine practice, Davenil may be used. We have, admittedly, not reached the success for which we hoped in treating canine distemper, but, on the other hand, when pneumonia is present it has a very encouraging effect. It is thus of general benefit, it spares the animal what otherwise might be a prolonged period of toxic stress.

Clinical Articles

SPECIFIC OR RECURRENT OPHTHALMIA

By RICHARD HUDSON, F.R.C.V.S.
Retford.

THE rarity of the disease to-day may make a case worth reporting.

It is said to have been common in the coaching days and in pit ponies. Many cases were observed in army horses during 1914-1918 and some strayed into the country, but with these exceptions the practitioner rarely meets with it.

The cause is still obscure, but the predisposing causes, bad sanitation, bad stable management and heredity, may be evident. Heredity, in that some constitutional tendency is imparted to the progeny, may account for the cataracts we find, for they are a common sequel of an attack. One can imagine a mild case passing unobserved and cataract resulting. So we have one good reason for cataract being on the list of hereditary diseases.

Possibly vitamin deficiency may play a part, particularly vitamin A, which has been proved responsible for various eye troubles.

The lighter breeds of horses have been the most susceptible and this is surprising when we consider the bad stabling of most farms.

The subject was a five-year-old hunter mare.

She had been exercised regularly and doing two days' hunting a week.

When brought out one morning one eye was noticed to be weeping and partly closed. The next day it was worse, so I was asked to see her.

Symptoms.—There was no evidence of external injury. The eyelids were partly closed and tears were escaping, the conjunctiva was congested, the sclerotic vessels were distended, the cornea was clouded, the anterior chamber contained yellowish-white floculi in the lower part up to the level of the pupil which was contracted and would not open in the dark. Temperature and pulse were about normal.

If it is true that it takes from five to seven days for floculi to form (Van Mater) the condition must have been developing that time and have escaped observation.

Treatment.—Istin, ½ oz., was given in a mash and she was purged well for two days. This was followed by Calomel, 20 grains, three times daily in mashes for two days, then the same dose twice daily for three days.

The eye was covered with a hot fomenting pad sprinkled with lotion—plumbi acetate 2 ounces, zinc sulph. 1 ounce, aqua 24 ounces—and kept in position with a hood. Exercise was carried out as usual, the eye being kept covered. After 12 days' treatment the inflammation had subsided, the floculi had become absorbed, and the cornea was much clearer, but the iris was so tightly contracted that no pupil could be seen. Fomentations were discontinued, but the eye was kept shaded.

Atropine sulph., 4 gr. to 1 ounce, was prescribed and dropped into the eye every four hours.

Seen three days later, the pupil was found dilated and a little larger than the other one. The eye appears normal excepting that the cornea is not quite as bright as the other.

The response of the eye to atropine was pleasing, for I feared adhesions of the iris to the lens capsule. After some experience I would stress the importance of a good purging at once, the influence of mercury, the need for carrying out fomentations constantly until the inflammation has subsided, and keeping the eye shaded until it is normal.

THE VETERINARY SERUM INSTITUTE, MADRAS

By C. S. MURTI, G.M.V.C.,
Superintendent, Serum Institute, Madras

Of all the infectious diseases of cattle in the Madras Presidency, rinderpest has been responsible for the largest number of deaths. Anti-rinderpest serum, which has been in use for preventive inoculation against the disease for many years past, was being obtained to a limited extent from

the Imperial Veterinary Research Institute, Muktesar, but the Madras Serum Institute was opened on April 7, 1932, so that an adequate supply of anti-rinderpest serum might be made available at a cheaper cost.

During these six years, this Institute has been able to meet the entire demand from the district staff of the Madras Civil Veterinary Department. It is noteworthy that the local production of serum has resulted in a saving of some lakhs of rupees to the local Government.

Rinderpest bull virus, required for serum simultaneous inoculation, is also supplied from this Institute. In addition, rinderpest goat blood virus and rinderpest goat's spleen tissue vaccine are also manufactured and supplied.

This Institute has also undertaken the production of anti-hæmorrhagic septicæmia serum from 1936 and hæmorrhagic septicæmia vaccine from 1937.

The manufacture of anti-blackquarter serum and blackquarter vaccine has already been sanctioned, but is held up for want of adequate accommodation, which is expected to be made available before the end of the year.

An idea of the work turned out at the Institute can be had from the following statement, which shows the quantities in each of the products issued from this Institute during the last six years:

Year	Anti-Rinderpest Serum (in doses of 5 c.c. each)	Anti-Hæmorrhagic Septicæmia Serum (in doses of 15 c.c. each)	Hæmorrhagic Septicæmia Vaccine (in doses of 5 c.c. each)	Rinderpest Bull Virus (in doses of 1 c.c. each)	Rinderpest Goat Virus (in doses of 1 c.c. each)	Rinderpest Goat's Spleen Tissue Vaccine (in doses of 1 c.c. each)
1	2	3	4	5	6	7
1932-33 ...	9,20,700	—	—	1,67,200	325	—
1933-34 ...	17,54,800	—	—	2,52,975	5,700	—
1934-35 ...	12,06,900	—	—	1,74,650	39,800	—
1935-36 ...	11,35,800	—	—	1,51,300	61,450	—
1936-37 ...	14,03,200	1,51,940	—	1,81,450	55,050	—
1937-38 ...	16,51,500	1,81,040	24,500	1,93,000	73,475	89,800

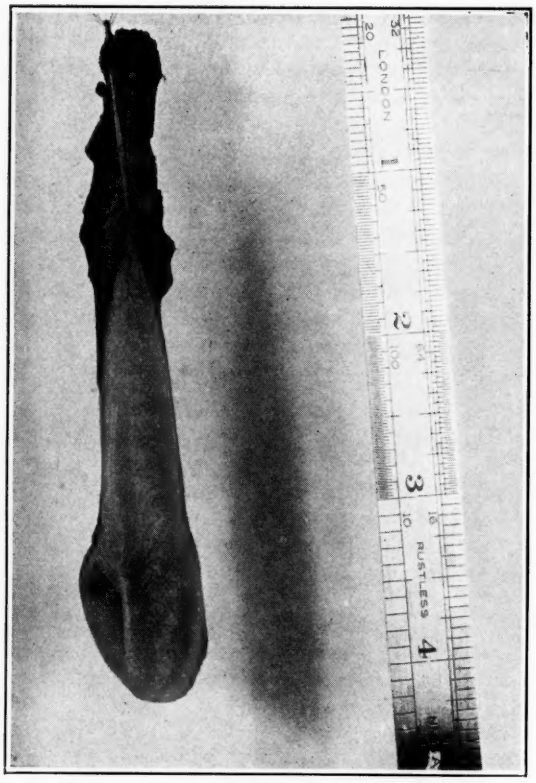
The Institute is located in Government buildings in the city of Madras near Perambur Barracks. It has a fairly well-equipped laboratory, cold storage, *pucka* sheds for animals, besides the administrative block.

ACTINOMYCOSIS IN MAN

By OLIVER WALKER, M.B. (Liverpool)
R.A.M.C.

THE author relates a very interesting case of actinomycosis in man, in which case improvement followed the administration of sulphanilamide; and recommends that this remedy be given a further trial.

A.B., aged 23, a soldier, was admitted to the Queen Alexandra Military



Prolapse of Penis in a Bear.

To face page 191.

Hospital, Millbank, in September, 1937, with a gangrenous appendix. A persistent discharging sinus ensued and this was explored in November but failed to close. Actinomyces were first demonstrated in the pus from the discharging abdominal sinus on February 1, 1938, when a mass filling the right iliac fossa was readily palpable. Potassium iodide and later Lugol's iodine were administered without apparent benefit. On March 3 the discharge was as profuse as ever and " sulphur granules " showing typical filaments of actinomycosis microscopically were readily demonstrable.

From March 4 to 10 inclusive sulphanilamide, 1.0 gramme thrice daily by mouth, was administered, and this treatment was rapidly followed by lessening of the purulent discharge and disappearance of " sulphur granules." So remarkable was the result that the treatment was repeated on March 20 for a further five days. On March 29 there had been no discharge for four days and the sinus had closed. On May 12 the abdominal wound had firmly healed, the mass in the right iliac fossa had entirely disappeared, the abdominal discomfort had vanished, and the general health was greatly improved.

It is worth while to test this treatment in cattle suffering from this complaint.

A CASE OF PROLAPSE OF THE PENIS IN A CAPTIVE BEAR TREATED BY AMPUTATION

By HUGH DONOVAN, M.B., F.R.C.S.
Birmingham.

THE following case appears of sufficient rarity to be worthy of record. In August, 1938, I saw, at the request of Dr. Honigmann, scientific adviser to the Dudley Zoo, a young American black bear, five to six feet in length, shoulder height about 3 ft. 6 in.

On May 23, 1938, it was noticed that the animal's penis was in a state of semi-erection. Two days later he was withdrawn from exhibition. This state of semi-erection persisted with little or no improvement up to the time of operation.

On examination about four inches of red penis projected from the hair-covered portion in a semi-erect state (Illus.). Micturition was observed to be free, and nothing else abnormal was to be seen. The cause of the condition was obscure. There is in the bear, as in the dog, a penial bone—the os penis.

This is situated in the septum of the corpus cavernosum, and in this particular animal was about eight inches long—the size and thickness of a lead pencil. There exists in the dog (also in the bear) a slip of muscle extending along the ventral surface of the bulb from the anal region which appears to function as a retractor of the penis. Priapism in man occurs in a number of conditions, but whatever the exciting cause the penial lesion has been suggested to be due to a thrombosis in the cavernous tissue. In man in time the organ becomes normal in size. Possibly thrombosis may have been the cause in this bear, the prolonged erection causing eventual permanent damage to the retractor muscle from undue stretching. An entirely different explanation, however, is that the animal was suffering from paralysis of the penis with prolapse of the organ, a condition well recognised in the horse, but seldom met with in other domestic animals. The underlying pathology of this prolapse has been variously suggested to be trauma of the pudic nerves, toxic neuritis (as in influenza and equine pneumonia), a lesion of the spinal cord, a myogenic disorder and osteomalacia.

Treatment

In the horse the condition is said to improve with improvement in the health of the animal. Three operations have been suggested, namely, amputation, Adam's operation of excision of an annular segment of the inner prepuce, and Vernerholm's operation of removal of the integuments of the penis from a short distance behind the glands to the base of the organ with transverse suture of the gap.

In the case under consideration it was decided to amputate the exposed portion of the organ, and this was carried out in October, 1938.

The animal was shut up in a stout box. Ether was administered by Dr. Murtagh through a small hole, about four pints being poured in. In 10 to 15 minutes the patient subsided on the floor; the box was opened and he was tied down on a wooden crate in the cage in the open air. The anæsthetic was continued on an open mask, full surgical anæsthesia being obtained, the corneal reflex being present throughout the operation. With proper surgical asepsis the projecting portion of the penis was amputated just beyond the hairy skin. First the urethra was dissected out and divided about 1½ inches beyond the proposed site of section of the penis. It was inconspicuous and difficult to find, barely admitting a fine probe. Next the shaft of the penis was divided circularly on to the bone in the septum. This was then cut with bone forceps, and the dorsal artery ligated. The urethra was slit ventrally and transplanted through the ventral end of the incision which was then closed with chromic catgut in two layers, tunica albuginea and skin.

The animal made a good recovery and on March 17, 1939, was reported to be back in the bear ravine. No difficulty in micturition has been noted.

Abstracts

THE BLOOD PICTURE AT BIRTH IN THE CHICK*

By W. P. BLOUNT, Ph.D., F.R.C.V.S.
Lewes, Sussex.

In the day-old calf there are marked changes in the blood picture contrasted with that of the adult cow, but in the case of the day-old chick many more marked features are observed. In both, a relative neutrophilia is a constant finding, but in the chick the erythroblastosis picture of the fœtus persists prominently. Indeed, the erythrocytes so dominate the field few white cells are noted—the total leucocyte count, although only 8,000 per c.mm., is almost double that seen in chicks "in-shell."

At birth, erythropoiesis is extremely active and all forms of erythrocytes and their precursors may be found in the blood-stream—red cells representative of regenerative and degenerative forms being noteworthy. It is interesting also to observe that the erythrocyte at this stage never fully matures, because the nucleus remains purple coloured and does not assume the blue tints of the older red cells seen in healthy adult poultry. (Pappenheim's panoptic staining —modified Piney.)

Erythroblasts, both basic and polychromasic, are common, some of the former showing typical mitotic figures. Large numbers of the immature erythrocytes degenerate, so that nuclear remnants and erythroplastids are common. However, a number of others do exhibit pyknotic nuclei, frequently with hyperchromatic cytoplasm. Microblasts (hæmocytoblasts—Emmel) are common, as are certain specially small thrombocytes, but there is probably a direct genetic link between the two cells, therefore their numerical relationship is to be expected.

The leucopenia observed is characterised by a marked relative predominance of the neutrophiles, many of which are small but some are larger than normal, i.e., *pre-neutrophilic myelocytes.* Their granules are more round than typically rod-shaped and they stain more basically than usual in avian

* Extracted from a thesis presented by the writer to the Edinburgh University, November, 1938, for the degree of Doctor of Philosophy.

neutrophiles. The basiphile granulocytes are often immature with an incomplete complement of granules and a neutrophilic cytoplasmic groundwork. A few birds also show true pre-myelocytes in blood films, but this is not common to all day-old chicks.

Türk-type cytoplasm is common in the few lymphocytes and monocytes noted.

Although it is probably quite correct to consider this type of blood picture normal and merely representing a physiological transition stage from that of the embryo chick in-shell to one typical of the adult bird, the features noted are identical with those considered by Emmel as " hæmocytoblastosis."

A number of chicks actually emerging from the shell, many of which would have been unable to break through of their own accord and would probably have died, have also been examined. These show the same features described for day-old chicks, but some are more accentuated.

The hæmoglobin percentage, total leucocyte count and relative neutrophilia are lower than normal at birth, indeed, the deficiency of leucocytes is so acute it is impossible to find even 100 cells for counting purposes. In many day-old pigeons it is impossible to find even one normal leucocyte in a film—all the cells being of the erythrocyte series, but in day-old chicks of the domestic hen the leucopenia is never quite so complete.

NORMAL BLOOD PICTURE OF THE DOMESTIC HEN

	Chicks in-shell	*Day-old Chicks*	*Chicks 10 days old*	*Mature pullets*
White blood cells	4,275	8,400	9,433	27,000
Hæmoglobin %	61	73	66	74
RBC's (000's)	2,250	2,500*	2,700	3,174
Early granulocytes	++	+	—	—
Neutrophiles	51.6	64.6	52.0	20.3
Eosinophiles	3.2	1.4	2.3	3.0
Basiphiles	6.6	3.1	6.4	2.4
Large lymphocytes	8.4	4.4	5.8	11.7
Medium lymphocytes ...	17.0	13.8	15.3	—
Small lymphocytes	10.9	11.6	17.6	62.2
Total lymphocytes	36.0	29.8	38.7	73.9
Monocytes	2.4	0.9	0.2	0.4
LL : SL ratio	.87 : 1.0	.61 : 1.0	.53 : 1.0	.19 : 1.0
Erythroblasts	++++	+++	+	—
Erythroplastids	+++	+++	+	—
Anisocytosis	+++	++	+	+

Chicks stuck in-shell show considerable variation in the size of the red cells—an anisocytosis more marked than that in healthy young chicks, they also

* Recorded in the literature—Biely and Palmer (1935).

show numerous neutrophiles ruptured, due no doubt to their defective construction having been disclosed by the preparation of the film.

Poikilocytosis is not common and punctate basiphilia never seen at all.

The accompanying table shows the chief features of the blood picture in chicks contrasted with that of older birds.

The figures for individual chicks vary somewhat during the first day of life, no doubt due to the fact that chicks purchased as day-old may in fact be early or late hatched, i.e., a few hours or even 36 hours old, for in the present-day type of mammoth incubator the hatching process is not disturbed until the end of the 21st day, and some chicks pip on the 20th day of incubation.

THROMBOCYTE FORMATION IN THE DOMESTIC HEN

UNFORTUNATELY some textbooks refer to the mammalian blood platelet as a thrombocyte, whereas, of course, according to the opinion of many authorities based on Wright's work (1910), the blood platelet is derived as a fragment from the marrow megakaryocyte, and therefore in itself is not a cell.

The writer would like to pay tribute to McGowan's (1936) valuable contribution on amitosis in blood formation in the domestic hen. Few references to the subject are found and fewer still to any relation it may have to the subject of thrombocytopoiesis.

Patterson (1907) studied amitosis relative to pigeons and concluded that it was the result of special physiological conditions which create a stimulus to cell division. Maximow (1908) also considered that energetic growth is the stimulus for amitosis. Considerably later, Wilson (1925) came to the conclusion that amitotic cell division occurred in cells of "weakened vitality"—in fact a sign of degeneration. McGowan (1925) concludes that "Amitosis is the chief, if not the only, mode of division and multiplication of the stem cells of the blood." He also states that "Amitosis would appear therefore to be a mechanism, whereby cell shape and size can be altered without alteration of the intrinsic nature of the cell." McGowan therefore concludes that amitosis is responsible for the appearance of anisocytosis and poikilocytosis in the circulating blood, particularly so in leucotic fowls where an irritative hyperplasia of the marrow exists. He also attributes the same type of cell

division as being responsible for the formation of "Fusiform cells" in the hen—thrombocytopoiesis—associating this process with amitotic division of the *erythrogenic* stem cells.

It will be seen, however, that this fact alone cannot account for the formation of thrombocytes, for in such a case the cell division will have "altered the intrinsic nature of the cell" from a respiratory function to one associated with blood clotting.

As far as can be ascertained, this is the first reference in the literature to an association between erythrocytopoiesis and thrombocyte function, therefore McGowan deserves every credit for what may appear to many to be a somewhat remarkable statement.

In the present investigation, the writer has acquired certain morphological data which tends to confirm McGowan's claim that the avian thrombocyte is related to erythropoiesis. However, although there appears little doubt that the thrombocyte is a cell of the erythrocyte series undergoing involution, no evidence has been acquired which suggests that thrombocytopoiesis normally follows amitotic cell division.

The Thrombocytes

The thrombocytes are smaller (5u x 10u) than the erythrocytes (7u x 12u), but of similar though not identical shape, being fusiform rather than oval.

Thrombocytes possess several important characteristics. The nucleus is like that of the small lymphocyte, rather pyknotic, but more oval and frequently eccentric in position. At the same time, although thromboplastid* formation does occur, extrusion of the nucleus is not as common as in the case of the red cell (erythroplastid formation), therefore the reticular degeneration accompanying normal thrombocytopoiesis cannot be as advanced as in erythroblastosis.

The cytoplasm stains only faintly—very pale dull blue colour—and is frequently vacuolated. Azur points or "dots" are common and in many instances a few such red granules may be seen clumped together within a vacuole. The majority of thrombocytes have both azur granules and vacuoles, but some cells have only the one or the other and a few have neither of these features.

Under stress of production numbers of thrombocytes lose their characteristic fusiform appearance and thereafter all shapes may be noted, including round ones, presumably related to the round erythrocytes, also observed when the bone marrow is stimulated abnormally.

In the opinion of the writer, the thrombocyte is an erythrocyte in which the process of hæmoglobinisation of the cell does not proceed to maturity.

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* A thromboplastid is a circulating thrombocyte having lost its nucleus.

Maturation of the cell as a member of the erythrocyte series fails, and as a result of degenerative phenomena the cytoplasm loses its characteristic polychromasic-eosinophilic tinctorial property (i.e., it is non-hæmoglobiniferous) to stain faintly basiphilic. If the cell is visualised as an involuted semi-degenerate erythrocyte and if it is agreed that the nucleus of the red cell is supported by a reticular framework, it is perhaps easy to understand why the thrombocyte nucleus readily becomes displaced from its central position.

A characteristic feature of the thrombocyte is its full oval-round nucleus which contrasts clearly with the contracted and more narrow nucleus of the erythrocyte. This feature is noteworthy in the early stages of thrombopoiesis immediately following the departure from the true erythroblast characters. It is this feature of the nucleus which causes some confusion between the thrombocyte and certain of the small lymphocytes which have nuclei of similar shape. Considerable experience may be necessary to differentiate the two cells, and it is this point in computing the differential count which has caused the data of certain workers to show such wide variations from the average normal figures.

The majority of thrombocytes show vacuolation of the cytoplasm, eccentricity of position of the nucleus and one or more intra-cytoplasmic " granules." These are frequently found within a vacuole and assume azur tints after the use of Giemsa stains. No evidence was obtained to show that these granules were remnants of hæmoglobin as suggested by certain authors, and certainly from their colour in stained preparations they are more closely related to the azur cytoplasmic inclusions of the lymphocytes than to the unaltered hæmoglobin of erythrocytes.

Contrasted with the circulating red cells of the blood, the nuclei of the thrombocytes are more oval associated with their general fusiform shape which differs from that of a typical erythrocyte. In the same way that there are found in the blood stream—notably under stress of production—round instead of oval erythrocytes, so one finds round thrombocytes. In the turkey, rounded thrombocytes are very common in blackhead, in which disease the vacuoles of the thrombocytes are large and the azur granules deficient.

The accompanying diagrams* drawn from numerous blood films depict some of the features described.

On rare occasions a thromboplastid will be seen in which the nucleus has disappeared, probably by extrusion as seen in the formation of erythroplastids. In supravitally stained films the thrombocytes show basic staining inclusion spots allied to those in the erythrocytes and quite dissimilar from the fine basic points of the lymphocytes.

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* The coloured diagrams concerned are not capable of reproduction in this article.

If films stained brilliant-cresyl-blue are counterstained with Pappenheim's panoptic method, the azur granules of the thrombocytes contrasting with the pale blue cytoplasm resemble greatly the blood platelets of mammals. The function of the thrombocyte relative to blood clotting is believed to be similar to that of the blood platelet.

All stages of the erythroblast-thrombocyte series can be detected in smears prepared from the bone marrow. Thrombocytes with double nuclei are rare, but afford further evidence of their association morphologically with erythrocytes in which the same structure can be noted.

SCHILLING'S GUTTADIAPHOT BLOOD PICTURES

SCHILLING'S well-known Guttadiaphot blood-testing papers can be used satisfactorily on most of the lower animals, but they are useless for assessing the normality of avian blood, for the following advanced Guttadiaphot reaction will be given by any normal hen:

I = (a) + *b* + (e)
II = *b* + *e*
III = b + *d* + *e*

This failure was recorded by the writer in 1931, but since that time an additional point of interest concerns the development of a "halo" which surrounds the drop of blood on the Tallquist absorbent papers when used for poultry. Its appearance is striking, especially if viewed by holding the slip direct to the light—and it is a specific feature for normal avian blood, although a similar halo occurs when using the blood of cattle suffering from secondary anæmias, such as that accompanying tuberculosis and Johne's disease.

In 1931 the writer was not using the Tallquist method for estimating hæmoglobin, therefore the association between this halo and Schilling's "ring" was not known. The Tallquist reaction is typical and would be classed as advanced corona formation if the Guttadiaphot papers were substituted for that of Tallquist.

A survey of the accompanying table shows that although the degree of

corona formation is not directly proportional to the percentage of hæmoglobin, a rough relationship between them exists as follows:

Tallquist % Scale	*Corona Formation W.M. Index*
40 — 50	3.8
51 — 60	2.6
61 — 70	2.5
71 — 80	1.8
81 — 90	2.2

Exceptionally wide halos are seen accompanying the anæmias, but as the hæmoglobin percentage rises so the size of the halo progressively diminishes, but not in direct proportion. At all stages there are birds whose blood shows fairly advanced corona formation independent of the hæmoglobin percentage.

The width of the halo, therefore, is more probably related to the viscosity of the blood plasma rather than to any simple deficiency of hæmoglobin *per se.*

Mammalian bloods only show similar corona formation in disease—that in healthy poultry is a specific phenomenon for *Aves.*

ARTIFICIAL INSEMINATION OF DOMESTIC FOWL*

By R. O. BILTZ

School of Veterinary Medicine, University of Pennsylvania.

ARTIFICIAL insemination is a valuable procedure from a practical as well as an experimental standpoint. Artificial insemination was first tried on the dog in 1784, but a successful technique for use in poultry work was not developed until a few years ago when Burrows and Quinn, of the United States Bureau of Animal Industry, described several techniques which were found to be very efficient. Their method seems to have many advantages over some of the earlier procedures. In 1913, Ivanov collected the semen from the

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* From the University of Pennsylvania Bulletin, April 15, 1939.

vas deferens of cocks which had been killed. Jull and Quinn in 1931 secured semen from the cloaca of the hen immediately after mating. A dish was placed between "two correspondents" by Amantes, in 1922, and by Dunn, in 1927. An animal membrane bag was used by Ishsikawa in 1930, and in 1934 Adamstone and Card used an artificial cloaca made of thin rubber.

The only equipment necessary when using the Burrows and Quinn method is a small funnel, the stem of which has been filled with paraffin. This is used to collect the semen and since the amount collected from a male fowl varies from .1 c.c. to several c.c. it is advantageous to use a receptacle from which the small amount of semen may be removed with a syringe.

One's first efforts to collect semen from a male fowl are not always successful. The descriptions of the methods do not appear to be complicated but some difficulty may be encountered in learning the technique. It is important that the bird be held in a proper and comfortable position. Hence, it is necessary that the operator be assisted by someone who will hold the bird in the proper position.

Genital Anatomy.—Due to the peculiar anatomy of the genital organs of birds the methods used are quite different from those used when working with mammals. The copulatory organ of the male fowl is in the ventral wall of the cloaca.[1] "The vasa deferentia enter the dorsal wall of the large intestine in close proximation to the ureters, but they do not pierce the intestine at that point, as do the ureters. The vasa deferentia proper empty into ducts which at that point lie between the walls of the large intestine, but which soon enter the musculature of the internal sphincter. These ducts traverse the dorsal quadrants of the sphincter, enlarge into bulbous pockets within the musculature and emerge from the ventral, posterior surface in two elongated papillæ.

"These papillæ normally lie directly over the groove or furrow of the erected organ. The semen is ejected quite forcibly from these papillæ during copulation, but generally follows the groove to the apex of the organ, which during copulation enters the protruded oviduct of the hen." Normal erection lasts one or two seconds.

In the turkey the organ is larger and terminates in a double apex.

Method.—The person assisting the operator should grasp the feathered portion of the left leg of the bird with his right hand and the right leg with his left hand. The bird is then placed in a comfortable position on the right hip of the assistant.

The operator then massages the soft portions of the abdomen between the gizzard and the pelvic bones with his right hand in an endeavour to stimulate ejaculatory responses. The left hand is placed on the back of the bird and the thumb and fingers are slid to the rear in the region of the tail, or the left hand may be placed to the rear of the tail when the thumb and fore-

finger will be in position to milk the semen from the ducts. The funnel may be held in the operator's right hand. By this method, relatively large samples of semen may be collected at a time convenient for the operator. This method also has been successful in collecting semen from male turkeys which are sometimes very difficult to work with for this purpose.

Experiment with Turkeys.—Last spring three male turkeys were submitted to the Pathology Laboratory of the University of Pennsylvania Veterinary School for examination. Bird No. 1 was a Bronze tom which had been mated with Bronze hens: the eggs from this mating were fertile. Bird No. 2 was a Wild tom mated with Wild hens and all the eggs from this mating were infertile. Bird No. 3 was a Wild tom which had been mated with Bronze hens and the eggs from this mating were also infertile. Of the fifteen attempts to collect semen from these toms, semen was collected ten times from No. 1, but none was secured from Nos. 2 and 3. The latter two were sacrificed. The testes on examination were found to be very small, of a dark cream colour, and rather nodular; the vas deferentia did not reveal the presence of spermatozoa.

Advantages of Artificial Insemination.—Artificial insemination may be used to produce crosses of different species, or breeds. A large number of females may be treated with semen from one good male, thus extending his usefulness. The method has a practical application where hens are kept in laying batteries. Fertile eggs may be produced two days after insemination.

Experimental work by Burrows and Quinn has "shown that fertility equal to that which occurs in natural matings was obtained by artificially inseminating chickens with 0.05 c.c. of semen once a week."[2] They also state that with the use of 0.02 c.c. of semen once a week, an average of three hundred and fifty females may be kept fertile from a single male.

Method of Insemination.—The method for artificial insemination consists in exposing the oviduct and injecting the semen directly into it. The left hand is placed under the hen so that the breast rests on the palm of the hand, and the index finger between the legs. The hen is placed with her head in a downward position and her back against the abdomen of the operator. A slight protrusion of the vent is caused by pressure of the thumb and fingers of the left hand on the lower abdomen of the fowl. Added pressure supplied by the thumb and forefinger of the right hand to the rear of the abdomen aids in exposing the entrance to the oviduct and the anus. The right hand should be placed so that the thumb and forefinger will span the area above the vent. Experienced operators can, by applying more pressure with the forefinger, evert the oviduct without exposing the anal opening.

A small tuberculin syringe, without a needle, containing semen is inserted into the exposed orifice of the oviduct. After pressure is slowly released from

the abdomen, the syringe is permitted to enter the oviduct as far as it travels with ease. The semen is then discharged from the syringe. If the injection is made properly, the semen will have been discharged into the oviduct and none of it will be found outside the cloaca. The syringe should be withdrawn slowly.

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1 Burrows, W. H., and Quinn, P. J.: "The Collection of Spermatozoa from the Domestic Fowl and Turkey," *Poultry Science*, Vol. XVI, 1: 19-24, January, 1937.

2 *Ibid.* Burrows, W. H., and Quinn, P. J.: "Effective Dosage of Undiluted Semen in Artificial Insemination of Chickens," *Poultry Science*, Vol. XVII, No. 2, March, 1938.

"BONNIE," THE CLEVER DOG, ANSWERS TO QUESTIONS IN LETTERS*

In the *Stampa di Turino* there is a communication from Mailand dated December 27, 1937, stating "that there is a dog in Mailand named 'Bonnie' (living in Giorgio Pallavicini 23) belonging to Herr Gino del Mar, which answers questions in letters."

All letters of the alphabet in wood of different colours have been made for her and from these she picks out the answers. When her master asks her what she wants, the dog quickly spells out "Zwieback" (a rusk), or if she wishes to drink "Wasser" (water), or if she wants to go out "Spaziergang" (a walk). Her vocabulary is not very large, but more than sufficient to make herself understood. The journalist who has made Bonnie's personal acquaintance relates that during his visit a company of cavalry from the nearby barracks rode down the street. Bonnie was taken to the window and when asked, "What have you seen, Bonnie?" she immediately chose the different letters of the alphabet and gave the answer, "Soldaten, Pferde" (soldiers, horses).

In a letter to the owner of the dog, Frau Raetz, of Sackingen, states that Bonnie is a Scottish terrier of pedigree breed purchased at three months old and kept for a year and a half by Russell Roberts, of Villefranche sur Mer un Nizza.

The bitch soon learnt the usual commands given to a well-trained dog and we noticed that Bonnie had a retentive memory and could distinguish many objects. Then I thought that if the bitch could distinguish objects by the different sound of words she might easily learn to distinguish letters from each other and learn them by single sounds. In five months Bonnie had learnt

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*Founded by Professor Max Muller, of Munich, and translated by Mr. Gladstone Mayall.

to recognise and pick out the 21 letters of the alphabet. She asked for what she wanted and showed that she had learnt some very good Italian; then she used words which I had no opportunity to teach particularly or specially. She had a great memory for persons.

Now it is especially interesting that she teaches us what the signs are to be used for her support and entertainment.

Herr del Mar remarks that Bonnie picks out letters with astonishing ease even when the letters are mixed up in a jumble and always gives right answers. She can distinguish different parts of the body, also knows what the weather is like, and has a knowledge of abstract things and ideas. When asked: "Do you speak to other dogs?" Bonnie says: "No." "But you make other dogs understand you?" Bonnie: "Yes." "How do you do it?" Bonnie: "By signs." "How do you say 'Yes' and 'No'?" Bonnie: "With my ears." "How do you say 'Yes' then?" Bonnie makes a definite movement with her ears. "And how do you say 'No'?" Bonnie makes another movement with her ears. "If you wag your tail when with other dogs what do you mean?" "Play." "If I speak to you and you wag your tail what do you mean?" "Joy." What is most astonishing to me is how the dog reacts and understands complicated questions, e.g., "What has Bonnie on the point of the snout?" Bonnie: "The nose." This answer is given quite spontaneously.

When I had received a letter I wrote on a slate the words "Bonnie Hinlegen." I wrote "A Tera" (Terra only with one "r"). I showed the writing to Bonnie and asked: "Have you seen it?" Bonnie: "Yes." "Tell me what you have read." She immediately got hold of the letters and placed them as I had written them.

This shows that animals in close and daily contact with men bring thought to bear on words given to them. It shows that what has hitherto been accepted, that man alone is capable of notional thought and that this faculty is the fundamental difference between man and animals, is false.

Animals living in close contact with men can learn lessons in ascending grade and they can be taught to give expression to them. Without numbering but in the sound of the words the dog can select and arrange letters.

The critics and deniers of animal thought say that the dog has four limbs and man only two, and that the brain of man is large and that of the dog small, and that no man has the ability to understand the notional thought of high-placed animals. In teaching animals to number it is said that this is only due to reflex mechanism, but we of the old Association for Animal Psychology know that animals in close contact with men are capable of notional thought.

Notional thought, either for numbers or letters, can be observed in animals, and this thought can be advanced and developed. Understanding and reason are not the sole prerogatives of man, but occur in a degree in high-

placed animals and the needs of their life can be reached and obtained by them in the company of man.

Body and soul, form and spirit are not dualistic in man, but monistic in man and animal, not in the sense of a material monismus, but an idealistic one. The teaching that notional thought distinguishes man alone, and that reason can be transmitted to him alone, is false.

(*Stampa di Turino.*)

EQUINE ENCEPHALOMYELITIS*

History

ENCEPHALOMYELITIS or sleeping sickness of horses was at one time described as forage poisoning or cerebro-spinal meningitis and thought to be due to animals eating spoiled feed or drinking contaminated water. This view was held until 1930, when Dr. Karl F. Meyer, of California, proved that the disease was due to a germ which gains entrance to the animal body and locates in the brain. The germ in question, known as a filterable virus, is so small that it cannot be seen even with the aid of our most powerful microscopes and is capable of passing through very fine porcelain filters.

We now recognise two types of encephalomyelitis viri (germs) on the American continent, one known as the Western and the other as the Eastern strain. Although the symptoms of Eastern and Western encephalomyelitis are identical, the viri (germs) are so different that only a vaccine prepared from the Western virus will protect animals against the Western disease, the same being true of the Eastern strain. Owing to this fact, it is necessary to have the type of virus determined before making use of vaccines and serums. This has been done with regard to the Saskatchewan disease and it has been found to be due to the Western type of virus.

Encephalomyelitis was very prevalent in California in 1930, soon spread into the adjoining States and in a few years could be recognised in most of the western States of the Union. It should be understood that the disease is not a new one. In fact, as early as 1847 it was probably responsible for the great losses among horses in eastern and western United States which was, at that time, considered as forage poisoning.

In 1935 a disease of horses appeared in the northern States of the Union, spread into southern Manitoba and from there to the south-eastern part of Saskatchewan. The symptoms presented by such diseased animals strongly resembled those of encephalomyelitis; in fact, the disease was immediately

* Published by the Canadian Government Authorities for the benefit of the farmers and horse owners. There have been several very terrible and fatal outbreaks in Saskatchewan and other Provinces during recent years.

considered as such although the presence of the virus had not yet been demonstrated.

Realising the seriousness of the situation, work was immediately undertaken with a view to determining the presence or absence of the virus in question. Brains from a number of horses which had died from the disease were secured and by laboratory methods prepared and inoculated into experimental animals and, after several such attempts, it was found that the virus of encephalomyelitis was present and definite diagnosis of the disease in Saskatchewan was made for the first time.

The outbreak of 1935 commenced late in July and did not reach its peak until towards the end of August, gradually subsiding until the onset of cold weather, after which few cases developed. In 1936 only isolated cases of the disease appeared, but in 1937 and 1938 very extensive outbreaks were experienced. The 1937 epidemic again commenced in south-eastern Saskatchewan, spreading from there throughout the Province generally. In 1938 encephalomyelitis appeared almost spontaneously over Saskatchewan and at a much earlier date than had the previous outbreaks, the first case being recognised towards the end of June. The fact that the epidemic appeared suddenly and throughout the Province at the same time strongly suggests that there is now a reservoir for the virus and until such is destroyed or the cycle of the virus broken, we might expect the disease to appear quite regularly unless steps are taken to protect susceptible animals.

Symptoms

The symptoms presented by animals suffering from encephalomyelitis are not at all constant, in fact the disease might be classified as of two types, depending upon the signs exhibited.

1. *Nervous Type*: In the nervous type the animal appears highly excitable at the onset of the disease, is afraid of objects to which it was hitherto accustomed and even afraid of attendants it had known for years. The horse may stand quietly for a few minutes pressing its head against the manger or any solid object when suddenly it becomes excited, jumps into the manger or actually attempts to climb the wall. As the acute inflammation of the brain subsides, these symptoms become less pronounced and in the majority of cases paralysis of certain muscles begins to appear. Very often the throat muscles are the first to be affected, rendering it impossible to swallow. The muscles of the hind limbs may also become paralysed, when the patient will go down and will be unable to rise.

When handling horses suffering from the nervous type of encephalomyelitis, great care should be exercised, as many people have been injured by such animals when they become unmanageable. Do not trust even the quietest of horses during the acute stages of encephalomyelitis, as at that time they are quite irresponsible and liable to do serious damage.

2. The other type of encephalomyelitis had been aptly described as the dumb form. In such cases the first symptom noticed is dullness, the animal standing for hours at a time, apparently quite uninterested in its surroundings. If in the stable, there is a tendency to back up in the stall and pull slightly on the halter. When forced to move, actions of diseased horses are slow and deliberate and, as the disease progresses, the gait becomes uncertain. When standing, the feet are spread apart as if to prop the body and, in some instances, affected animals will lean against the stall, something which is seldom done by horses suffering from any other disease. In the so-called dumb type, paralysis sets in early and, unless the disease process is checked, death usually results.

Transmission

How the disease is transferred from one animal to another is not clearly understood, although it is thought to be carried by means of biting insects which may convey the germ from the blood of a diseased horse and impart it in the same way to the blood stream of healthy animals. This theory is strengthened by the fact that encephalomyelitis is strictly a seasonal disease appearing late in June when the weather becomes warm and flies are most numerous, gradually subsiding with cooler weather and suddenly disappearing after a severe frost.

Treatment

The treatment of developed cases of encephalomyelitis is not very satisfactory unless instituted during the early stages. Whenever possible anti-encephalomyelitis serum should be given in large quantities, administering not less than 250 c.c. Medicinal treatment is usually of little avail, in fact, drugs should not be given by the mouth unless one is absolutely certain that the throat muscles are not paralysed. When the throat is paralysed, medicine given by the mouth usually goes to the lungs, causing mechanical pneumonia—a disease from which few animals recover.

The patient should be made as comfortable as possible and, if lying down most of the time, should be turned regularly. The stall should be bedded deeply to prevent sores developing and cold drinking water should be within the animal's reach at all times. Ice packs or cold water applied to the head have been found beneficial. Bleeding should not be practised, as very often such treatment weakens the animal and retards recovery. In many districts, as a means of prevention, farmers have applied tar and oil to the horse's ears. This should not be done, as it is of no value, is highly irritating and actually cruel. Many so-called cures are now on the market. These should be looked upon with suspicion, as there is no sure *drug cure* for encephalomyelitis, the only reliable agent we have being anti-encephalomyelitis serum.

Prevention

During the first two outbreaks of encephalomyelitis in Saskatchewan, we were dependent upon anti-serum and brain vaccine for the prevention of the disease, neither of which was highly satisfactory. Since that time, however, a new vaccine has been developed which is prepared by growing the virus of encephalomyelitis on developing chick embryos.

A great deal of experimental work has been done at the University Veterinary Laboratory and considerable vaccine was produced and used in the field. A very careful survey reveals the fact that the product has been highly satisfactory in preventing the disease in horses, and experimentally it has been shown that it will protect susceptible animals against massive doses of virulent virus (germs) introduced directly into the brain. The vaccine in question is, no doubt, one of the most satisfactory that has ever been developed for the prevention of any disease, and its use is strongly recommended.

Transmission to Man

Although the economic aspect of encephalomyelitis presents a problem which requires all attention, it should also be realised that from a public health point of view the disease is of great importance. During 1938 it was definitely proven that man may become infected with the virus of equine encephalomyelitis, and when such does occur, a very serious illness results. The mortality is usually quite high and those surviving are very often left incapacitated either physically or mentally.

Since we now know that humans are susceptible to the equine virus, every effort should be made to eradicate the disease from our studs and this can quite readily be done if vaccination is practised extensively. Persons attending developed cases of equine encephalomyelitis should exercise great care, as it has been shown that the virus is very often contained in the nasal discharge and this seems a possible source of the human infection. There is no need to become alarmed when handling infected horses, as it would appear that humans are not highly susceptible, although the possibility of infection should always be borne in mind. Animals having died from this disease should be immediately buried or burned, as flies may transmit the virus from dead animals to healthy horses.

Summary

1. The vaccine used for the prevention of encephalomyelitis is given in two doses of 10 c.c. each, ten days apart.

2. Experiments conducted at the Veterinary Laboratory at the University prove that a single dose vaccine cannot be relied upon and its use is strongly advised again.

3. Horses which have recovered from encephalomyelitis should be vaccinated each year as should horses which were vaccinated last year.

4. Mares in foal may be vaccinated without harmful results.

5. Colts should be vaccinated when about two to three weeks old. The dose is the same as for adult horses but divided, giving 5 c.c. on two successive days and repeating this in ten days' time.

6. Vaccination may be practised most advantageously from the beginning of April until the end of May.

7. Horses can be put to work during the vaccination period.

8. The duration of immunity produced by vaccination is from six to seven months.

9. If the services of a qualified veterinary surgeon cannot be procured, it is much safer to do the work yourself rather than to employ unqualified individuals who may use the wrong type of vaccine and may carry disease from one farm to another.

10. The cost of the vaccine is 73½ cents plus education tax for a complete double treatment of two 10 c.c. doses.

Method of Vaccination

1. A 10 c.c. hypodermic syringe should be used, and may be had equipped with two needles for not more than $1.95. The instrument and needles must be boiled for thirty minutes.

2. A small area in the centre of the horse's neck half-way between the shoulder and head is clipped and cleansed with rubbing alcohol.

3. The needle is now attached to the syringe, inserted through the rubber cap on the vaccine bottle and the contents drawn into the syringe.

4. The skin on the site prepared is held out with the left hand, the needle introduced beneath the skin and the vaccine injected.

5. When the needle is removed, the site is again touched with clean gauze which has been wet with or soaked in rubbing alcohol.

6. After the needle has been used it is placed in a small vessel, such as an egg cup, containing rubbing alcohol before it is used on another horse. The alcohol, of course, should be blown out of the needle before using and this is best done by

(a) Pulling the plunger of the syringe half way up

(b) Attaching the needle

(c) Forcing the alcohol out.

7. At all times handle the needle with the base so as not to contaminate the part being introduced beneath the skin.

8. At high temperature chick vaccine will quickly lose its effectiveness and until ready for use it should be kept at ice box temperature—from 35-40 deg. F.

Serum

Serum is for the treatment of developed cases only and should never be used as a preventative when chick vaccine is obtainable.

Reviews

Operations Kursus für Tierärtze und Studierende. By DRS. W. PFEIFFER and M. WESTHUES. Published by Richard Schoetz, Berlin. With 120 illustrations.

This little textbook has been the descriptive handbook for the German student and practitioner for the past forty years and during that time has passed through numerous editions. The last two have had the valuable collaboration of Dr. M. Westhues, the Professor of Veterinary Surgery in the University of Munich, under whose auspices a number of operations have been added. These have their technique fully described in detail and elaborated by very clear illustrative figures which add much to the value of the book for the purpose for which it is written, i.e., as an operation guide.

It is equally of use to the practitioner who is suddenly called upon to perform a surgical operation as to the student who is preparing for his surgery examination; in fact, to each it is invaluable and the fact that it has passed through numerous editions, and is still the standard textbook on the subject after nearly half a century, bears witness to the high opinion in which it is held.

Some of its previous editions have been translated into French and English, but for those who read and understand German this present edition is the best and most up to date—containing, as it does, some fifty added or carefully revised pages on general, local, intravenous and epidural anæsthesia, all well illustrated.

The publishers have done their part well, the book is of handy size, well and conveniently bound for use when required for reference alongside the dead subject or the living patient.

Diseases of Fur Animals and Their Control. By E. HEIDEGGER, D.V.M., Teacher in the Animal Faculty of the University of Munich, 1938, Pelztierkrankheiten und ihre Bekämpfung. Pp. 172. 125 Figs. Price RM. 9.50. Munich: P. C. Mayer.

This book, in the German language, is written for the benefit of breeders and rearers of fur-bearing animals and deals mostly with management and measures to be observed in keeping the animals healthy. In other words, it is a preventive medicine work for fur farmers. It does not deal with the treatment of diseases, which is the veterinary surgeon's province. It may be usefully read along with Dr. Schoof's book (reviewed on page 294 of the July issue of 1938).

The literature on fur-bearing animals is sparse and these two books fill a

much-noticeable hiatus which, considering the advance in the production of fur-bearing animals and the value of their furs, is important. Dr. Heidegger writes with the authority of over 10 years' experience in the fur domain so his teaching is describable as mature.

Four chief sections in the book deal with hygiene and diseases of the silver fox, mink and nutria. The illustrations in the book are excellent and the binding and printing good.

News

THE Ministry of Agriculture and Fisheries have approved the use of the well-known antiseptic "Dettol" for veterinary purposes. "Dettol" may be confidently used as a disinfectant for diseases notifiable under the Diseases of Animals Acts and Orders of the Ministry. The official dilution given for these cases is one part of "Dettol" to 19 parts of water.

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